

We claim:

- 1.** An apparatus comprising:
a needle;
a catheter, wherein said catheter receives said needle; and
a sensor, wherein said sensor senses an orientation of at least one of a feature of said needle or a feature of said catheter.
- 2.** The apparatus of claim 1 wherein said feature comprises a bevel.
- 3.** The apparatus of claim 1 wherein said sensor resolves orientation of said feature in at least one direction.
- 4.** The apparatus of claim 1 wherein said sensor comprises a MEMS device.
- 5.** The apparatus of claim 1 wherein said sensor is physically coupled to said needle.
- 6.** The apparatus of claim 2 wherein said catheter comprises said bevel.
- 7.** The apparatus of claim 1 wherein a data processing system receives a signal that is indicative of said orientation of said bevel.
- 8.** The apparatus of claim 7 wherein said sensor is electrically coupled to said data processing system.
- 9.** The apparatus of claim 7 wherein said signal is transmitted wirelessly to said data processing system.
- 10.** The apparatus of claim 1 further comprising a housing, wherein said needle and said catheter are disposed completely outside of said housing until inserted therein by a user to simulate a vascular access procedure.
- 11.** The apparatus of claim 1 further comprising pseudo skin, wherein said needle and said catheter are inserted through said skin to simulate a vascular access procedure.

- 12.** An apparatus comprising:
 pseudo skin;
 a force-feedback assembly, wherein said force-feedback assembly is disposed beneath said pseudo skin; and
 an end effector, wherein said end effector reversibly couples to said force-feedback assembly.
- 13.** The apparatus of claim 12 wherein said end effector comprises a needle.
- 14.** The apparatus of claim 12 wherein said end effector comprises a catheter.
- 15.** The apparatus of claim 12 further comprising a data processing system, wherein said force-feedback assembly receives a control signal from said data processing system.
- 16.** The apparatus of claim 15 wherein signals that are indicative of a position of said end effector are transmitted to said data processing system.
- 17.** The apparatus of claim 12 further comprising a housing, wherein said force-feedback assembly is disposed within said housing.
- 18.** The apparatus of claim 12 wherein said end effector comprises a needle-catheter module, wherein said needle-catheter module includes:
 a needle;
 a catheter, wherein said catheter receives said needle, and wherein an end of at least one of said needle or said catheter comprises a bevel; and
 a sensor, wherein said sensor senses an orientation of said bevel.
- 19.** The apparatus of claim 18 further comprising a data processing system, wherein said data processing system receives a signal that is indicative of said orientation of said bevel.

- 20.** An apparatus comprising:
an end effector;
pseudo skin, wherein said pseudo skin has a first side and a second side, and
wherein said end effector is disposed on said first side of said pseudo skin; and
a receiver for receiving said end effector, wherein said receiver is disposed on
said second side of said pseudo skin.
- 21.** The apparatus of claim 20 further comprising a housing, wherein said receiver
is disposed within said housing, and wherein said pseudo skin is substantially co-
planar with a surface of said housing.
- 22.** The apparatus of claim 20 wherein said pseudo skin comprises an opening,
and wherein, to simulate a vascular access procedure, said end effector is inserted
through said opening and removably coupled to said receiver.
- 23.** The apparatus of claim 20 wherein said receiver has at least one rotational
degree of freedom and at least one translation degree of freedom.
- 24.** The apparatus of claim 20 wherein said end effector comprises a catheter.
- 25.** The apparatus of claim 20 wherein said end effector comprises a needle.
- 26.** The apparatus of claim 20 wherein said end effector comprises a sensor.
- 27.** The apparatus of claim 26 wherein said sensor senses an orientation of said
end effector.
- 28.** The apparatus of claim 27 further comprising a data processing system,
wherein said data processing system receives a signal that is indicative of said
orientation of said end effector.